

**PATENT APPLICATION**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

MARCHIONNI et al

Group Art Unit: Not yet assigned

Serial No.: New Application

Examiner: Not yet assigned

Filed: December 28, 2001

Attorney Dkt. No.: 108910-00047

For: PERFLUOROPOLYETHER ADDITIVES FOR ELECTROCHEMICAL  
APPLICATIONS

**PRELIMINARY AMENDMENT**

Commissioner for Patents  
Washington, D.C. 20231

December 28, 2001

Sir:

Prior to calculation of the filing fees and initial examination of the application,  
please amend the above-identified application as follows:

**IN THE CLAIMS:**

Please amend claims 3, 5, 7-9, 11-13 and 15-17 as follows. A copy of the  
marked up original claims is attached to this response showing the changes as set forth  
in amended 37 CFR 1.121.

3. (Amended) Electrolytic compositions according to claim 1, furthermore  
comprising:

- one or more aprotic polar solvents;
- a conductive salt.

5. (Amended) Electrolytic compositions according to claim 3, wherein the aprotic polar solvents are selected from 1,2-dimethoxyethane, 1,2-diethoxyethane, 1,3-dioxolane, 2-methyl-1,3-dioxolane, 4-methyl-1,3-dioxolane, tetrahydrofuran, 2-methyltetrahydrofuran, 1,4-dioxane, N,N-dimethylformamide, dimethylsulphoxide, ester carbonates such as dimethylcarbonate, diethylcarbonate, propylencarbonate, ethylencarbonate.

7. (Amended) Electrolytic compositions according to claim 1, wherein the concentration of conductive salt in the electrolytic solution is higher than 0.5 moles/litre, preferably in the range 0.5-2 moles/litre.

8. (Amended) Electrolytic compositions according to claim 1, wherein the concentration of the perfluoropolyether additive is higher than 10 meq/litre (calculated as cation  $M^{n+}$ ), preferably in the range 10 meq/litre-500 meq-/litre.

9. (Amended) Electrolytic compositions according to claim 1, wherein the ionic species are at least partially dissolved or dispersed in a matrix material.

11. (Amended) Electrolytic compositions according to claim 9, wherein the matrix material in the form of solid polymer is selected from polyethylenoxide, polyesters, polyacrylates, polyvinylidenefluoride, polyacrylonitrile.

12. (Amended) Electrolytic compositions according to claim 9, wherein the matrix material in the form of porous solid membranes is selected from polyethylene, polypropylene having a surface tension in the range 28 - 35 mN/m (dyne/cm).

13. (Amended) Electrolytic compositions according to claim 1, wherein the perfluoropolyether additive of formula (I) is obtainable by conversion of the fluorosulphonyl groups  $-SO_2F$  into  $-SO_3M$  groups carried out on the homopolymers of the monomer  $CF_2=CFOCF_2CF_2SO_2F$  or on the copolymers of said monomer with perfluoroolefins.

15. (Amended) Use of the electrolytic compositions according to claim 1, in electrochemical systems, such as lithium batteries.

16. (Amended) Electrochemical system comprising the electrolytic compositions according to claim 1.

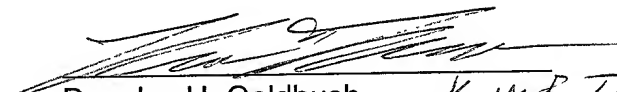
17. (Amended) Perfluoropolyether additives according to claim 1.

#### **REMARKS**

Claims 1-17 are pending in this application. By this Amendment, claims 3, 5, 7-9, 11-13, and 15-17 are amended to correct the multiple dependencies thereof and to place this application into better condition for examination. No new matter has been added.

In the event that there are any fees due with respect to the filing of this paper,  
please charge Deposit Account No. 01-2300.

Respectfully submitted,

  
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Enclosures: Marked-up Copy of Amended Claims

**MARKED UP COPY OF AMENDED CLAIMS**  
**ATTY. DOCKET NO. 108910-00047**

3. (Amended) Electrolytic compositions according to [claims 1-2] claim 1,  
furthermore comprising:

- one or more aprotic polar solvents;
- a conductive salt.

5. (Amended) Electrolytic compositions according to [claims 3-4] claim 3,  
wherein the aprotic polar solvents are selected from 1,2-dimethoxyethane, 1,2-  
diethoxyethane, 1,3-dioxolane, 2-methyl-1,3-dioxolane, 4-methyl-1,3-dioxolane,  
tetrahydrofuran, 2-methyltetrahydrofuran, 1,4-dioxane, N,N-dimethylformamide,  
dimethylsulphoxide, ester carbonates such as dimethylcarbonate, diethylcarbonate,  
propylencarbonate, ethylencarbonate.

7. (Amended) Electrolytic compositions according to [claims 1-6] claim 1,  
wherein the concentration of conductive salt in the electrolytic solution is higher than 0.5  
moles/litre, preferably in the range 0.5-2 moles/litre.

8. (Amended) Electrolytic compositions according to [claims 1-7] claim 1,  
wherein the concentration of the perfluoropolyether additive is higher than 10 meq/litre  
(calculated as cation  $M^{n+}$ ), preferably in the range 10 meq/litre-500 meq-/litre.

9. (Amended) Electrolytic compositions according to [claims 1-8] claim 1, [wherein] wherein the ionic species are at least partially dissolved or dispersed in a matrix material.

11. (Amended) Electrolytic compositions according to [claims 9-10] claim 9, wherein the matrix material in the form of solid polymer is selected from polyethylenoxide, polyesters, polyacrylates, polyvinylidenefluoride, polyacrylonitrile.

12. (Amended) Electrolytic compositions according to [claims 9-11] claim 9, wherein the matrix material in the form of porous solid membranes is selected from polyethylene, polypropylene having a surface tension in the range 28 - 35 mN/m (dyne/cm).

13. (Amended) Electrolytic compositions according to [claims 1-12] claim 1, wherein the perfluoropolyether additive of formula (I) is obtainable by conversion of the fluorosulphonyl groups  $-\text{SO}_2\text{F}$  into  $-\text{SO}_3\text{M}$  groups carried out on the homopolymers of the monomer  $\text{CF}_2=\text{CFOCF}_2\text{CF}_2\text{SO}_2\text{F}$  or on the copolymers of said monomer with perfluoroolefins.

15. (Amended) Use of the electrolytic compositions according to [claims 1-14] claim 1, in electrochemical systems, such as lithium batteries.

